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A CONTRIBUTION TO THE CLINICAL STUDY

OF RÖTHELN OR GERMAN MEASLES.

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A CONTRIBUTION TO THE CLINICAL STUDY OF RÖTHELN OR GERMAN MEASLES.

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It appears to be a somewhat general opinion that Rötheln, or, as it is not infrequently called, German measles, is a disease of such minor importance as to be unworthy of scientific research. A number of the standard text-books devote but meagre space to its description, and dismiss it in very few words. A somewhat extended experience has convinced me that in Rötheln we have a disease the careful study and analysis of which will amply repay one for the thought and time expended in the work. A disease, the victims of which succumb as early as the fourth day, cannot but be of sufficient importance to demand our attention and the best efforts of our armamentarium. Who among us does not watch carefully the scarlatinous case for any outward symptom referable to the genito-urinary tract? and who, again, looks with disdain upon the respiratory symptoms or complications of measles? In Rötheln we have a disease which should doubly claim our attention, as cases are often met with presenting symptoms or complications analogous to those of measles or scarlatina; or again they may combine the two, as, for example, presenting kidney symptoms together with the mucous-membrane involvement seen in measles, this combination in one of our cases proving fatal.

During the spring and winter of 1881–82 some hundred odd cases of Rötheln were admitted to the Philadelphia Hospital; since then I have attended forty more; sixteen cases were observed and noted by my friend, Dr. G. E. de Schweinitz, who has kindly given me his notes. In all, a total of about one hundred and sixty-six cases is the groundwork upon which I base my conclusions.

That the cases were Rötheln is further attested by Drs. Van Harlingen, John M. Keating, and Walker, who saw many of them in consultation.

Etiology.—This disease was described during the last century by German physicians as "Rubeola;" it was then a new disease, unlike any recognized fever. Somewhat earlier French and English writers were describing "Roseola," a disease new to them. To Orlow, in 1758, we are indebted for the best earliest description of the disease. As late as 1822[1] and 1835[2] papers were written which much confounded the proper classification and recognition of the disease.

The former paper advocated the identity of Rötheln and scarlatina, teaching that the former was a protection against the latter, and that both only appeared in combination. The latter advanced the statement that Rötheln did not exist, and that it was scarlatina.

Heim regards it as an anomalous scarlatina, more dangerous than that disease itself.

Others declare it measles, and attribute its peculiarities to a "certain individuality;" these are the writers who describe a "Rubeola morbillosæ et scarlatinosæ." When we come to Hildebrand and Schönlein, we find them discussing an hermaphrodite form of measles and scarlatina; so one could go on multiplying to a great extent, only showing in the end the chaotic state of the writings on the subject.

A vast amount of the confusion which has arisen in the recognition and classification of this disease is due, as Thomas says, to a too minute and restricted consideration of the conditions of the skin, which, to my mind, is responsible for the various opinions that prevail in regard to the nature of the disease.

When we reflect that formerly variola, scarlatina, and morbilli were regarded as identical, one can readily see that it is but too easy to fall into the error of "hybrids;" the complete differentiation of these three diseases has been the work of centuries.

W. B. Cheadle, in a paper read before the International Medical Congress, at the seventh session, held in London, in 1881 (vol. iv. p. 4), says most distinctly that Rötheln is a specific, contagious exanthem, distinct from either measles or scarlatina.

Its specific cause we are as yet unable to isolate, just as no one has as yet demonstrated, beyond peradventure, the cause of any of the eruptive fevers. Microscopic examination of the blood of many of these patients, made by Dr. H. F. Formad and myself, proved the presence of micrococci in the blood, liquor sanguinis and white corpuscles, though to a less extent than in the blood of the children suffering from malignant measles. We were unable to trace such direct relation of the micrococci to the etiology and prognosis of the disease as we have shown in the cases of malignant measles.[3]

[1] Goden. [2] Jahn: Ziemssen's Encycl., vol. ii. p. 129.

[3] John M. Keating. The presence of the micrococcus in the blood of malignant measles; its importance in treatment.—*Trans. Col. Phys. of Phila.*, June 7, 1882.

The disease is more prone to be epidemic than its congeners, and its contagiousness seems to depend greatly upon the exposure and amount of the contagium absorbed, let it be what you will, which appears to come off in the cutaneous exhalations and the breath, and to be conveyed by fomites, clothing, etc.; as many of our cases could be distinctly traced to infected ships, particularly the "bunks" of the steerage passengers, an environment which would also present heat and moisture, potent factors in its production, as, for example, in the Island of Malta, after the rainy season, the disease prevails to its greatest extent.

Age does not appear to offer any immunity; children (Emmighaus, 5–10 years; Smith, 6 years), however, are more frequently attacked than adults, although the latter are by no means exempt, as we witnessed several severe and prostrating attacks in women from twenty to thirty years of age. Seitz reports a case in a woman aged seventy-three.[1]

Sex. More adult females were attacked than males, but this, I think, is accounted for by the fact that they are much more exposed than the male members of the family.

E. H. Sholl[2] has seen it transmitted from a pregnant mother (7 months) to her unborn child, and developed a few days after the birth of the child.

It further partakes of the characteristics of its class in the fact that one attack offers some protection from future invasion, and it does NOT protect from the other fevers, *notably* scarlatina and measles, as many of our patients had had these diseases. Some, in fact, were just recovering from them when prostrated by Rötheln.

This has been the experience of several writers. Dr. G. B. Harrison[3] had a case of Rötheln in a patient who had had scarlatina in 1856 and measles in 1861. Dr. C. M. Jones[4] has seen cases preceded or followed by either scarlatina or measles, and a case is reported in which Rötheln occurred coincidently with vaccinia.[5] Most of J. B. Robinson's[6] cases had had scarlatina or measles; three adults were attacked; all had had measles, and one scarlatina.

Most of the one hundred cases reported by Dr. R. C. Park[7] had had measles. B. H. Riggs's[8] cases had previously suffered from measles or scarlatina. Out of sixty-three cases reported by Clement Dukes,[9] thirty-nine had had measles, one had Rötheln, and measles three weeks afterward, another measles twenty-two days later.

[1] Ziemssen's Encyclopædia.
[2] Tr. Med. Assoc. Alabama, 1881, xxxiv. p. 528.
[3] Virg. Med. Month., 1882–3, ix. 261–264.
[4] Boston Med. and Surg. Journ., 1881, cv. 607.
[5] Med. Times and Gaz., 1880, ii. p. 459.
[6] Canada Journ. Med. Sc., 1882, p. 111.
[7] Chic. Med. Journ. and Examiner, 1881, xliii. p. 130.
[8] Virg. Med. Month., 1879, vi. p. 589.
[9] Lancet, 1881, ii. 743–45.

A most interesting case, as bearing on the point at issue, is that reported by Henry Tompkins,[1] in which a girl, æt. 19, was attacked by Rötheln, lasting five days; *three days* after recovery she was attacked by *scarlatina*, as she had been sent to the hospital *as a scarlatinous case and there exposed to it.*

W. G. Burnie[2] states that Rötheln never communicates either scarlet fever or measles to anybody else, although *practically no* isolation is practised; certainly, if it were a hybrid, it must communicate one or other of its component diseases or protect against them. Again, quite a number of Dr. Suttleworth's[3] cases (27) subsequently contracted either scarlatina or measles. H. C. Brenchly's[4] case had genuine (?) scarlet fever while convalescing from Rötheln.

That the differential diagnosis of measles, scarlatina, and Rötheln is often difficult indeed, I admit, but certainly that can be no excuse for not giving this disease the separate place and classification that it merits in our nosology, notwithstanding the fact that the nomenclature of diseases issued by the Royal College of Physicians makes no mention of it. Its diagnosis is the more important, as mistakes, that jeopardize the life of the patient, are by no means uncommon; for example, Dr. Tompkins's case (ibid.); and Dr. Homan,[5] of St. Louis, has cognizance of a case which was sent to the *smallpox hospital.*

On looking over the text-books and standard medical works, one is struck with the meagre and insufficient account of Rötheln, a disease which undoubtedly can and does produce death, and appears to be gaining in strength and potency, as its *materies morbi* finds more soil for its multiplication and propagation.

Stage of Incubation.—This is, of course, the most difficult to decide positively, as symptoms were entirely absent during this time. As near as we could ascertain the duration of this stage was about ten days; at all events, between ten and twelve. The shortest period recorded was six days, and the longest twenty-one. The dates of this period are about in accordance with the observations of James Robinson[6] (6–7 days); Duckworth[7] (16); L. A. Claussen[8] (17–20); E. W. Earle[9] (17–21); Dr. Jacobi[10] (14–21); E. H. Sholl[11] (5–21); W. B. Cheadle[12] (11–12); Dr. James Pollock[13] (6–16); Dr. Johann Steiner[14] (10–14).

[1] Brit. Med. Journ., 1880, i. p. 808.
[2] Ibid., p. 848.
[3] Brit. Med. Journ., July 10, 1880, p. 49.
[4] Lancet, Nov. 18, 1870.
[5] St. Louis Cour. Med., 1881, vi. p. 21.
[6] Med. Times and Gaz., 1880, i. p. 459.
[7] Lancet, March 13, 1880.
[8] Chic. Med. Rev., 1881, iii. p. 228.
[9] St. Louis Med. and Surg. Journ., 1881, xli. p. 392.
[10] Am. Med. Ass.
[11] Ibid.
[12] Ibid.
[13] Lancet, May 12, 1877, p. 681.
[14] Comp. Children's Dis., trans. by Lawson Tait, London, 1874, p. 340.

Stage of Invasion; Symptoms.—All the cases presented abnormal temperature charts; about 30 per cent. did not reach above 100° in this stage; the others varied from this point to 103° F. Chilliness, languor, faintness, headache more or less severe, pain in the back and limbs, coryza, red and watery eyes, *sore throat*, cough, and a hoarse, husky voice are the most frequent notes of this stage.

The following additional symptoms were noted in about 15 per cent. of the cases: nausea and vomiting, delirium and convulsions, and epistaxis in three cases. Two cases of hemorrhage from the eyes and ears are recorded by J. Ford Prioleau.[1]

The average duration of this stage, in our cases, was *three days*, when the eruption appeared, the general symptoms in the mean while increasing in severity. This date is not in accordance with the observations of Wm. Henry Day[2] and Johann Steiner, the former placing its duration as but twenty-four hours, and the latter a few hours to two days.

It is the experience of John Binns,[3] James Copland,[4] W. D. Hemming,[5] and James Robinson that the duration of this stage is from two to seven days, the former advancing the longer period, the latter the shorter, the others intermediate.

Eruptive Stage; Symptoms.—After the above-noted symptoms had lasted about three days, an eruption appeared, generally first in the face, and rapidly extending over the whole body; the existing symptoms were greatly aggravated, in fact beyond what the temperature and pulse would seem to indicate. Occasionally a prodromal rash was noted to precede the specific eruption, more marked in the buccal cavity.[6]

C. J. Collingworth[7] has four times seen a severe attack of urticaria precede, for a few hours, the development of the characteristic rash of Rötheln. Erythema preceded the exanthem in four of our cases.

Rapid extension of the eruption progressively downwards, about in the following order, was most frequently noted: face, neck, chest, arms, back, groin, and lower extremities. The rash was multiform in character, more or less confluent, occasionally ill-defined; in colour, rosy or pale red. A few cases of the brightest scarlet and some purplish tints were observed. Patterson, of Leith, compares the appearance of the patch in color to that "produced by a writing-quill dipped in red ink, and having its point placed on moist white paper."[8] The rash was punctated, small macules were noted;

[1] Second Annual Report, State Board of Health, S. C., 1881, p. 227.

[2] Dis. of Children, Lond., 1881, p. 98.

[3] The Prin. of Med., including Dis. of Women and Child., Lond., 1838, p. 739, 9th edition.

[4] Dictionary of Prac. Med., vol. iii., part i., p. 655, 1858.

[5] Edin. Med. Journ., 1880, xxvi. p. 52.

[6] J. P. Kingsley, St. Louis Cour. Med., 1881, vi. p. 21. E. W. Earle, Ibid.

[7] Brit. Med. J., Dec. 22, 1883.

[8] Edin. M. and S. J., April, 1841, p. 381.

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over the non-vascular parts the rash was elevated, producing a rough skin easily detected by the touch. The patches were very irregular in outline, shape, and size, the last factor being the most irregular. The centre of each patch was much higher in colour than any other part.

Much hyperæmia of the intervening skin was present in many cases; itching was then a more marked symptom.

Dunlop[1] says that he has seen petechiæ, as has also J. L. Erskine,[2] in the uvula and soft palate. In rare instances the eruption goes on to the formation, upon hyperæmic spots, of a varying number of vesicles resembling miliaria.

Reed[3] records a case in which the eruption alone appeared upon the tonsils and velum palati, but no rash whatever on any external part of the body.

According to Thomas, the eruption is due to a capillary hyperæmia of the papillary body of the uppermost layers of the corium. The eruption was generally discrete; had little tendency to become confluent; when it did occur, it was most marked on the face or extremities.

Superadded to the previously existing symptoms the eruptive stage presented *rise* in *temperature* of from 1 to 3 degrees; 103°, 104° are recorded in the notes, the temperature being in proportion to the extent and severity of the eruption. Many of the little patients complained of a sense of constriction of the chest. *Sore throat* was *always* present, with enlargement of the tonsils, in some cases to a great extent. Hemming always observed sore throat as a distinctive symptom. This is also noted by Paterson, Dunlop, Murchison, Aitken, Liveing, Copland, and Balfour. Pharyngitis and dysphagia were also present.

Enlargement and induration of the cervical, post-cervical, and post-auricular glands were now present. Occasionally only one or two glands would be affected; in other cases the entire chain.

The cough was generally increased in severity and frequency, and became more laryngeal.

In quite a fair proportion of cases vomiting occurred as the eruption was approaching its maximum; in five cases it was almost uncontrollable.

Pulse.—The pulse-respiration ratio was in all the cases maintained, it falling with the temperature, and that with the disappearance of the rash. Pulses of 120, 130, 140, 150 were recorded. Several cases presented well-marked symptoms of heart failure, but were successfully treated by general and cardiac tonics.

Tongue.—Coated as the scarlatinous tongue, but never exfoliated as the tongue does in that disease.

[1] Thomas (Ziemssen).
[2] Lancet, Sept. 18, 1880.
[3] Phila. Med. Times, Nov. 17, 1883, p. 129.

The "strawberry" tongue was never met with; dry brown tongue appears in the notes of the more severe cases. Cleaning in patches was the most usual method of return to the normal appearance.

Urine.—This secretion was such as is found in all similar states, "febrile urine." Slight albuminuria was present in about 30 per cent. of the cases. Nine cases presented well-marked albuminous urine (one-fifteenth bulk) with dropsy. No tube-casts, however, could be detected. Reed (ibid.) says that one of his colleagues reports a case followed by slight albuminuria and dropsy. Kingsley, Duckworth, and Harrison have treated cases in which albumen was present in notable quantities. Aitken and Roberts[1] are of the opinion that albumen may be present, the latter adding that in rare instances acute renal disease with dropsy sets in.

Duration and Termination of the Eruption.—The average duration was five days; the shortest was scarcely two days; and the longest of all the cases was fifteen.

The eruption in all the cases was followed by *desquamation* of furfuraceous scales. In quite a number of the cases the desquamation was well marked, in others only on particular parts of the body, in these instances especially about the nose. A delicate brownish-yellow pigmentation was not infrequently observed after the eruption had subsided; this colouring did not appear to bear any relation to the colour of the eruption or its severity. The buccal cavity also partook of the general desquamation; it was here best marked in the throat proper. The peeling was by furfuraceous scales, and always commenced in the *centre* of an eruptive patch, then extending to the circumference. The larger scales were those from the hands and feet. Scholl has noted the desquamation protracted to the fortieth or fiftieth day. In our cases the duration of this process was very indefinite; in no instance, however, have I seen it last over twenty days, rarely that long.

Complications.—The respiratory apparatus was by far the most frequent seat of complication. Pneumonia or bronchitis occurred more frequently than any other disease; pleurisy was met once; gastro-intestinal irritation in about forty per cent. Ten cases of enteritis are recorded, two of entero-colitis, and one of tubercular meningitis. Stomatitis arose in four cases, as did rheumatism in two. Thrush was present in thirty cases. Dr. Smith is of the opinion that diphtheria is liable to follow Rötheln.

Miliaria, urticaria, and pemphigus are also occasionally met with. C. O. Curtman[2] was obliged to combat abscesses in various parts of the body; he sometimes met nephritic trouble.

Theirfelder[3] observes febrile œdema of the face, and Emmighaus a similar disturbance in the legs. Mettenheimer[4] a naso-pharyngeal catarrh, permanent swelling of the tonsils, and inflammation of the gums.

[1] 3d Amer., from 4th Lond. edit., 1880, p. 175.
[2] St. Louis Cour. Med., 1880, iii. 531.
[3] Greifsw. med. Beitr. Bd. ii. Ber. S. 14, 1864.
[4] Journ. f. Kind., Bd. 53, S. 273, 1869.

R. A. Alexander[1] has met five cases of facial erysipelas as a complication, occurring within a week after the disappearance of the rash; he also noted that tr. ferri chlor. was badly tolerated in all the cases.

Dr. de Schwenitz notes two cases of phlyctenular keratitis, and one in which several cicatrices in the popliteal space broke down and ulcerated. Fifty per cent. of R. Park's[2] cases presented marked adenopathy in the cervical region and under the tongue.

Relapse occurred in one case on the fourth day, in another on the twentieth.

Prognosis and Mortality.—The prognosis should be guarded; as Aitken says, "should be as guarded as scarlatina itself," as it is "often an extremely *fatal* disorder." As a general rule, however, it is a mild disease.

One of our cases died apparently from an overwhelming dose of the poison; the post-mortem did not reveal sufficient lesions to cause death. The lungs were much congested; bronchi hyperæmic and injected, covered with a copious mucous secretion.

Two succumbed to pneumonia, one to pneumonia and enteritis, two to entero-colitis, and one to tubercular meningitis. I may add that the cause of death in all our cases was verified on the post-mortem table.

It is Copland's experience that death may occur from affections of the respiratory passages, lungs, glands (?), digestive organs, urinary organs, or by dropsy and anasarca. In the practice of Dr. McFarlan[3] one case terminated fatally after an illness of *four* days; two other fatal cases occurred during the epidemic, one an *adult*.

R. A. Alexander lost one of his cases suddenly on the eighth day. During the eruptive stage death may occur from suffocation due to great mucous secretion in the throat, or from convulsions or subsequent coma.[4]

Diagnosis.—The eruption appearing on the third day first in the face, its rapid extension, its gradual shading off into the surrounding skin, its elevation, more particularly in the centre of the patch which is also the brightest colour, together with the fact that desquamation first shows itself there, are all points which, as far as the eruption is concerned, render the diagnosis plain; furthermore, the rash almost at once occupied the whole body, and never presented a crescentic outline. The extreme drowsiness during the eruptive stage is a symptom upon which Cheadle lays some stress.

It is Dr. J. M. Keating's[5] experience that, however severe the attack may be, or how diffused the eruption, the contour of the face is never lost, and that by looking properly you can always see the zygomatic arch; this, he observes, is always obliterated in cases of either measles or

[1] Can. Journ. Med. Sci., 1882, p. 297.
[2] Ibid.
[3] Can. Journ. Med. Sci., 1882, p. 205.
[4] Hemming.
[5] Personal communication.

scarlatina that are severe in character. *Sore throat* was *always* present; in scarlatina it is directly in proportion to the type and severity of the disease. The more laryngeal character of the cough in Rötheln is worthy of note. The pulse remains low, that is, much lower than a case of like severity of either measles or scarlatina; this is also Scholl's experience with a number of cases.

The fact that Rötheln propagates itself, and never gives rise to either measles or scarlatina, and, moreover, does not protect from these diseases, is a further diagnostic point that should claim our attention.

Treatment.—Rötheln is so distinctly epidemic and contagious that our first care was isolation, preferably in a large room, with temperature of about 60°–65° F.; in quite a number of the cases steam from a boiling kettle was admitted to the room. Particular attention was directed to the prevention of draughts or any possible sudden chilling of the cutaneous circulation, until the disease had run its course and all danger of complications had passed.

The diet was carefully graded to each case; those for whom a liquid diet was ordered received the following: *Breakfast*, milk Oss, bread ℥ij, butter. *Dinner*, milk Oss, rice or other milk pudding. *Tea*, milk Oss, bread ℥ij, butter. The more liberal diet consisted of an increase of the morning's milk, with an additional half ounce of bread; for dinner, roast, boiled, or minced mutton or beef, 2½ ozs., bread ℥j, milk pudding; tea, bread ℥ijss, butter, milk f℥iv. Mild aperient mixtures were ordered for the bowels as indicated.

For the troublesome cough, the following mixture was administered:—

℞. Ammonia muriat. ℥j.
Vin. ipecac. f℥ij.
Tr. opii camph. f℥ijss.
Syr. senegæ f℥vi.
Aquæ q. s. ad f℥iv.
M. Teaspoonful every 2 hours.

The oppression and sense of tightness about the chest, of which many of our patients complained, were treated by the application of hot poultices or fomentations; the more severe cases were painted with a mixture of equal parts of chloroform and tincture of iodine.

In but few cases did hyperpyrexia demand treatment; when necessary, the patient was carefully sponged. Signs of suffocation were always checkmated by warm mustard baths, and occasionally by cold douching.

The laryngeal affection was treated by constant application of heat and moisture externally over the larynx; in these cases steam inhalations were kept up continuously.

Many of the cases required in addition a general stimulant treatment by digitalis, carbonate of ammonia, ether, wine or brandy, and liberal liquid nourishment frequently administered. I would strongly recommend the use of an *oleaginous preparation* to the skin during the stages of erup-

tion and desquamation; in the former stage for the comfort of the patient, allaying itching and aiding in the reduction of the temperature; in the latter, to prevent contagion, as all of our cases underwent desquamation, and it is in all probability by those fine scales that the contagion is carried. We used either pure olive oil, Stone's cod-liver oil, which is very fluid, or the oleate of Bismuth, prepared either by L. Wolff & Co., or W. H. Schieffelin & Co.

Complications were treated as they arose; during convalescence much care was exercised to guard against colds. The patients were not infrequently placed upon general tonics, quinine, iron, and cod-liver oil, with cold bathing, preferably with salt water. They were directed to wear warm clothing, with flannel next to the skin.

The following is a list of papers on Rötheln, not especially mentioned in the text, which have been consulted in the preparation of this article.

W. Smith: Rubeola; epidemic roseola: Rötheln, so called German measles, Lancet, 1883, i. 994, 1036. Cases of Rötheln, Abstr. M. & S. Cases, Gen. Hosp. Sick Children, 1882, Pendlebury, Manchester, 1883, ii. 103, 109. *E. A. Cobleigh:* Rubeola and its treatment. Atlanta Med. and Surg. Jl., 1879–80, xvii. 257–265. *C. C. Yemans:* Rubeola, Mich. Med. News, Detroit, 1880, iii. 9. *D. Duckworth:* A case of Rötheln, Lancet, 1880, i. 395. *R. T. Henderson:* Rötheln, German measles, St. Louis Courier of Med., 1880, p. 534. *W. R. Gowers*, a Note on an Outbreak of Rubeola (Rötheln), Lancet, 1880, ii. 169. *T. M. Rooke:* The diagnosis of Rötheln, British Med. Journal, 1880, ii. 126. *C. W. Kollock:* A severe type of Rötheln, North Carolina Med. Journal, July, 1882, p. 5. *Louis A. Duhring:* Observations upon Rötheln, Phila. Med. Times, vol. xi. No. 348, p. 395. *D. D. Donovan:* Notes on Rötheln, Dublin Journal of Med. Science, 1880, 3 s. lxx. 447. *C. T Reher:* Mongrel or hybrid fevers, Am. Practitioner, 1881, xxiii. 72. *J. D. Smith;* Rötheln as an epidemic in West Tennessee, Miss. Valley Med. Monthly, 1881, i. 168. *E. R. Stone:* Rötheln or German measles, Med. and Surg. Reporter, 1881, xliv. 482. *F. C. Curtis:* Rötheln, Med. Annals, Albany, 1881, ii. 78–82. *G. N. Monette:* Rubeola, Indiana Med. Reporter, 1881, ii. 200. *W. Brodie:* German measles, Mich. Med. News, Detroit, 1881, iv. 200. *C. H. Dixon:* Rötheln, or scarlatina, St. Louis Courier of Med., 1881, vi. 39. *Hardaway and P. G. Robinson:* Rötheln, St. Louis Courier of Med., 1881, vi. 83. *H. Hartshorne:* Hybrid of measles and scarlet fever, Med. and Surg. Reporter, 1881, xlv. 81. *A. B. Loving:* Rötheln, Southern Med. Record, Atlanta, 1881, xi. 251. *J. W. Byers:* Rötheln, its symptoms and nosological position, British Med. Journal, 1881, ii. 76. *W. Squire:* On rubeola, rubeola sine catarrho; Rötheln or German measles, Archives of Dermatology, 1882, viii. 221. *Murchison:* Clin. Lecture on Rötheln, Lancet, vol. ii. 595, 1870. *W. Perrin Brown:* The diagnosis of Rötheln, British Med. Journal, 1880, ii. p. 49. *Tilbury Fox:* Skin diseases, 3d edit. p. 93. *James T. Hibbard:* Rötheln or German measles, Cin. Lancet and Observer, 1874, Dec. *Hennig:* Case of fever preceding the eruption of Rötheln, Archives of Dermatology, 1875–76, ii. p. 62. *J. H. Etheridge:* Diagnostic syllabus of Rötheln, scarlet fever, and measles, Chicago Med. Journal and Exam., vol. xxxii. No. 4, p. 312. *S. J. Radcliffe:* Memoranda of a case of rubeola immediately following scarlatina, Phila. Med. Times, 1879, ix. 597.

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